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BIOLOGICAL EVALUATION
MOUNTAIN PINE BEETLE INFESTATION
CASSIA DIVISION, TWIN FALLS RANGER DISTRICT
SAWTOOTH NATIONAL FOREST

1977

Forest Insect and Disease Management
State and Private Forestry
Intermountain Region
USDA-Forest Service

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INTRODUCTION

Data from earlier evaluations relating to infestation trend, tree and volume losses caused by the mountain pine beetle in lodgepole pine sawtimber stands on the Cassia Division have been updated and combined in this report. High epidemic trend and level of tree killing during the years of 1974-1975 have progressively declined through 1976 to an endemic status in 1977. Even though high risk factors (mainly large acreages of old growth, large diameter trees) are still present on the east half of the Cassia Division, any upturn of tree killing in the future will depend primarily upon favorable weather conditions. This would mean a period of consecutive summer seasons somewhat above normal in length, i.e., warmer temperatures early in spring and lasting longer in late summer, with low precipitation during the flight period in late July and August.

GENERAL INFORMATION

Insect: Mountain pine beetle, Dendroctonus ponderosae Hopk.

Host Tree: Lodgepole pine, Pinus contorta Douglas.

Location: Cassia Division, Twin Falls Ranger District, Sawtooth National Forest.

Type of Damage: Killing of old growth trees. Age classes 80 to 120.

Extent of Epidemic: Throughout approximately 15,039 acres of lodgepole pine sawtimber type.

SURVEY METHODS

Gary Kaiser,* David McClymonds,* and Arland Valcarce completed a ground survey August 30 through September 2, 1977, representing all of the lodgepole pine sawtimber stands on the Cassia. They measured or remeasured 147 established variable plots at BAF 20 using a Relaskop, Figure 1. New attack data obtained were used to calculate tree and volume losses for 1977. Green stand volumes were obtained from Kaiser and McClymonds' completed compartment examinations for the Cassia. Volume figures for green stand for the 1975-1976 surveys were revised using the same information. A newly calculated timber base of 15,039 acres reflected changes in both green and dead volumes.

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General observations on beetle activity such as emergence success, attack height, current brood development and woodpecker predation were made in all stands.

BIOLOGICAL INFORMATION

Acreage of lodgepole pine on the Cassia is comprised of hundreds of isolated individual stands at high elevation separated by wide expanses of grass-sagebrush or aspen type. Losses are variable, intermittent, and are occurring over longer periods of time than would be the case where stands are contiguous and occur at relatively low elevation.

Timing of the 1977 survey was favorable. Current season's beetle flight had ended. Night temperatures in the survey area were below freezing in the upper twenties; brief daytime highs were in the fifties.

Natural Control Factors

A high population of woodpeckers had developed by 1974 and increased even more in 1975 at the peak of the infestation. In 1976 intermittent cold, wet weather during the summer interrupted the beetle flight period. Beetle population levels were reduced and new attacks were about one seventh the 1975 level. During the 1977 survey, examination of trees attacked in 1976, within and around all of the sample plots, showed woodpeckers had destroyed most parent adults and very little brood had been produced. This apparently helped reduce the number of new attacked trees in 1977, Table 2. Currently, woodpeckers maintain high levels of beetle predation and are an important natural control factor along with weather. Even during intensive beetle outbreak periods, woodpeckers in local areas on the Cassia Division have commonly been noted destroying as much as one third of beetle brood populations.

RESULTS AND DISCUSSION

Tree and Volume Losses

Current volumes of green sawtimber remaining on the Cassia are less than projected in the 1975 report due primarily to the marked reduction of sawtimber acreage after remeasurement by the Forest. Adjusted live, dead and total volumes for 1974-1976 are shown in Table 1.

A volume loss of 33,835,644 b.f. is shown for the years 1974 through 1977 and a loss of 48,591,009 b.f. prior to 1974. Since the mountain pine beetle epidemic began with significant momentum about ten years ago, there has occurred a volume loss of approximately 82,426,653 b.f. of old growth lodgepole pine. Deducting this volume from the gross volume measured

for 1974 there currently remains on the Cassia 159,664,000 b.f. of green sawtimber, Table 1. These figures show that about 34 percent of the volume in merchantable-size trees on the Cassia has been killed by beetles during the current epidemic. Numbers of beetle killed trees on the Cassia reached a peak of 169,940 in 1975, increasing from 161,067 in 1974, then decreasing to 27,220 in 1976 and to 10,076 trees in 1977, Table 2. In addition, approximately 457,186 trees were killed prior to 1974 for a grand total of 825,489 trees killed since about 1968. Rate of decline of losses since 1974 is shown in Figure 2.

Current Beetle Activity

Mean beetle attack heights during an epidemic are normally 25 feet and higher from tree base. The average height of attack on the bole and resultant beetle infestation within individual currently attacked trees was just 8 feet from tree base further indicating the waning beetle infestation trend.

Only two "hot spots," where as many as 5- to 10-trees were successfully attacked in each group, were observed during the survey. One was found on the east side of Deadline Ridge at Porcupine Campground. All of the infested trees were removed and utilized for firewood by recreation and fire standby crews. The other "hot spot" was on the west side at Bear Springs. This area is isolated and supports its own infestation. A major proportion of large diameter trees were killed prior to 1977 and the infestation is expected to drop significantly in 1978. Wahlstrom Hollow area showed a high incidence of attacks in 1976 and has dropped virtually to a zero level. The west side, which has sustained the highest mortality equaling slightly over 40 percent of the merchantable sawtimber volume, shows a very low current level of infestation. The epidemic has essentially climaxed there and likely will not recur for many years.

The area west from Rock Creek generally lies at lower elevation and appears to have provided a supply of beetles or an "overflight" to the east. Without this inundation of beetles that occurred in the past to support local infestations and future weather changes that provide a long summer season, beetle broods cannot maintain large tree killing populations at higher elevations on the east half of the Cassia. At this time insignificant numbers of trees are being killed by beetles "flying in" and these new attacked trees are unable to produce brood much beyond woodpecker predation levels. The low incidence of tree killing on the east side will likely continue and drop even lower in 1978.

Deterioration of the Dead Trees

Lodgepole pine that has been dead one year (from the time it is attacked by beetles) will be checked or split lengthwise in several places to the center making it undesirable as sawtimber. A high percentage of boards will fall apart when sawed. After two years, checking of dead standing trees increases and in addition many large "worm" holes begin appearing

in the wood making the wood even less desirable for manufacture. "Worm" holes are primarily caused by "round headed" borers or the larvae of "long horned" beetles. Standing dead trees will produce sound fiber for chips, particles or paper for a number of years after being killed. Fiber, as such, is less in demand at present, although the situation can change within the time opportunity for salvaging dead standing trees. Trees will begin to fall 4-5 years after being killed by beetles.

Rotation Period

Lodgepole pine on the Cassia Division grows rapidly and becomes overmature and decadent by age 120. A short rotation age is indicated -- perhaps less than 80. Measurements show a half inch of diameter growth annually can be attained on young trees using optimum silvicultural techniques.

Opportunities exist for a silvicultural showcase in many Cassia Division sawtimber stands. Fiber growth potential is high.

RECOMMENDATIONS

1. Within the recently sold Cassia I Timber Sale, log those stands containing the largest sawtimber sizes first. Large trees provide potential for beetle buildup, without them an epidemic cannot sustain itself.

2. Log the lower elevation stands that fall in the large diameter size category first.

3. Accelerate sales on the east half of the Division where major volumes of green sawtimber remain. These highly susceptible stands should be logged during the next several years of anticipated low level beetle activity.

4. Give priority to stands infected with dwarf mistletoe in selecting sale areas as discussed in Hobbs' report to the Forest Supervisor, Sawtooth National Forest, file 5230, dated September 13, 1976.

REFERENCES

1975 Biological evaluation, mountain pine beetle infestation, Cassia Division, Twin Falls Ranger District, Sawtooth National Forest. USDA, Forest Service, Inter. Region Rpt. 7 p.

1976 Mountain pine beetle biological evaluation, Cassia Division, Twin Falls Ranger District, Sawtooth National Forest. USDA, Forest Service, Inter. Region Rpt. 3 p.

ADDENDUM

Analogy of Cassia to Targhee NF Infestations

Chemical treating of the boles of standing infested trees with ethylene dibromide on the Targhee was discontinued in 1970. Rate of tree losses at lower elevations was significantly slowed during this project (a project that had been in operation for seven years) which allowed large acreages of old growth lodgepole to be clearcut (utilized) ahead of the beetles. Since the time treating was discontinued, however, the higher elevation Island Park District, which had been protected from lower elevation influx of beetles to a large extent, has gradually returned to epidemic status with major losses occurring to old growth stands the past several years through 1977.

Decimation of the large trees on the west side (lower elevation) of the Cassia has reduced beetle potential and "overflight" to the east (Bostetter) side to insignificant levels.

Recommended by:

Alfred M. Rivas, Director
Forest Insect and Disease Management

Approved by:

William E. Murray, Deputy Regional Forester
State and Private Forestry

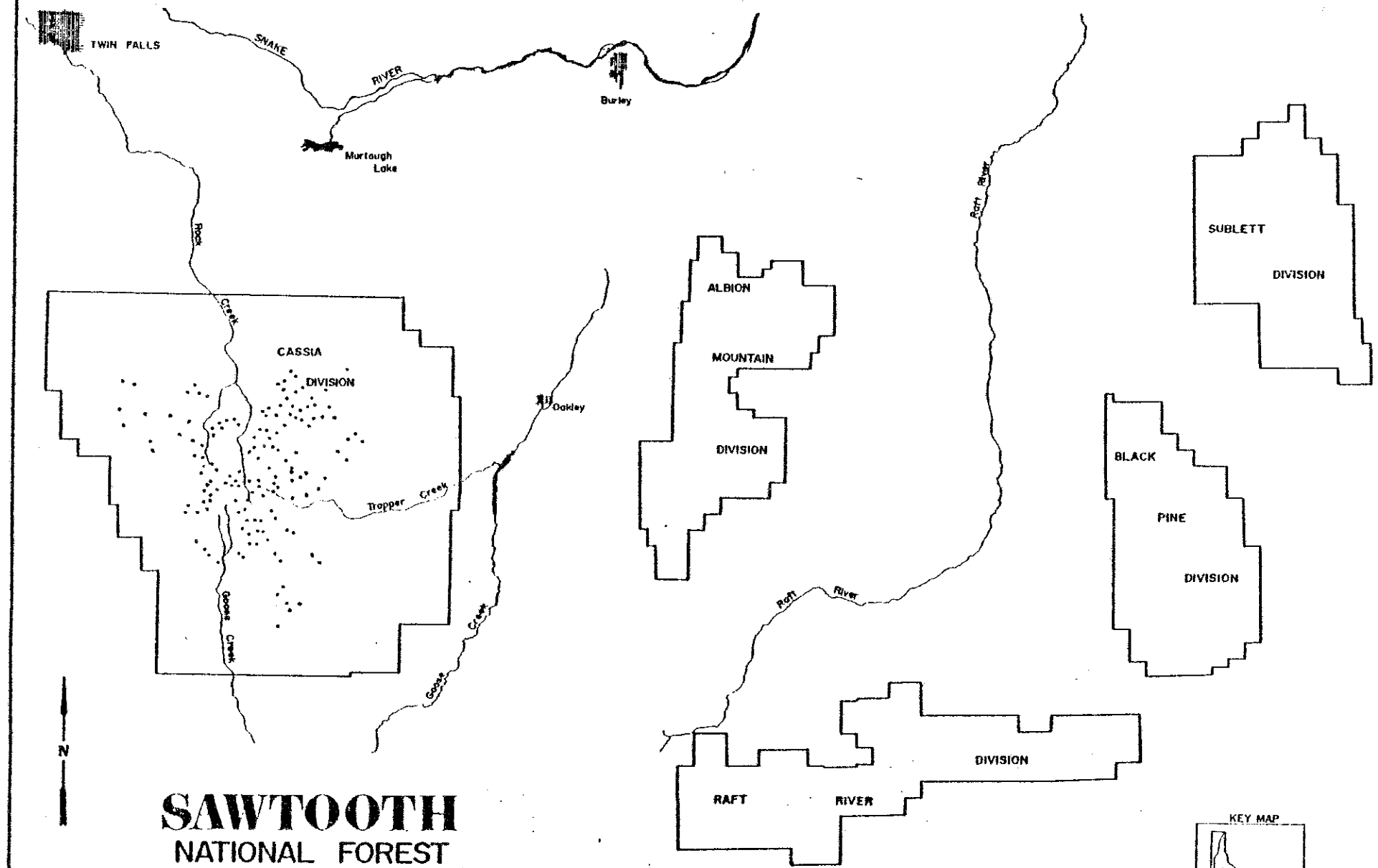

Figure 1.--Mountain pine beetle survey sample points (.). Cassia Division, Twin Falls Ranger District, Sawtooth National Forest, ID 1977

Table 1. Sawtimber Volumes Cassia Division, Twin Falls Ranger District, Sawtooth National Forest, 1974-1977.

	BOARD FOOT VOLUMES							
	Per Acre				Gross			
	Live	Mortality	OD*	Total	Live	Mortality	OD*	Total
1974	11,790	1,076	3,231	16,097	177,317,680	16,181,964	48,591,009	242,090,653
1975	10,865	925	3,231	15,021	163,406,605	13,911,075	48,591,009	225,908,689
1976	10,663	202.86	-	10,865	160,355,794	3,050,811	-	163,406,605
1977	10,616	46	-	10,662	159,664,000	691,794	-	160,355,794

*OD = Older dead (killed prior to 1974).

Totals for 1976, 77 include only current year's mortality.

Table 2. Mountain pine beetle caused mortality in lodgepole pine on the Cassia Division.

Year	No. Trees/ Acre	Total Trees	Vol./Tree (bf)
OD*	30.40	457,186	106.28
1974	10.71	161,067	100.47
1975	11.3	169,940	81.86
1976	1.81	27,220	112.08
1977	0.67	10,076	68.66

*OD = older dead (killed prior to 1974)

Figure 2. Rate of decline of losses from mountain pine beetle in lodgepole pine, Cassia Division, 1974-1977.